

## **Implementing CLIL in Higher Education in Thailand: The Extent to Which CLIL Improves Agricultural Students' Writing Ability, Agricultural Content, and Cultural Knowledge**

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### **Abstract**

The present study aimed to investigate the extent to which a CLIL (Content and Language Integrated Learning) course at university level in Thailand improves undergraduate Agricultural students' writing ability, agricultural content, and cultural knowledge. The study sample consisted of 27 students majoring in Agriculture at a public university in Thailand. Data were collected in the forms of writing, agricultural content, and cultural knowledge pre- and post-tests. The study findings suggested that after attending the CLIL course, the students showed significant improvement in their English writing abilities in both of the two text types: process and cause and effects, with better performance in all five aspects of writing, namely, content, organization, vocabulary, language

use, and mechanics of writing. It was also found in this study that the students' agricultural content and cultural knowledge increased, and that they had positive attitudes toward the CLIL course offered to them.

**Keywords:** CLIL, EAP/ESP, writing ability

## **Introduction**

### ***What is CLIL?***

CLIL is an acronym for Content and Language Integrated Learning which refers to the use of the target language in the teaching of non-language subjects. According to Coyle, Hood, and Marsh (2010: 3), it is “an educational approach in which various language-supportive methodologies are used which lead to a dual-focused form of instruction where attention is given both to the language and the content.” This corresponds with Bently (2010) and Dalton-Puffer (2007), who provided the definition of CLIL as a teaching approach or method which combines teaching subject matters with teaching the target language. Simply put, CLIL can be seen as an educational approach that involves both the target language and the subject matter which may not have to be associated with language learning.

Content and the target language, the two main elements in the acronym of CLIL, help reflect the underlying principles of the approach – the assumption that the target language can be best learned when the subject matter is conveyed through the language (Wolff, 2010). According to Wolff, classroom content must be drawn from content subjects or academic and specific disciplines rather than from everyday life or the general content of the target language. It is clear that CLIL draws on the beliefs that the target language can be best learned through academic classroom contents with the target language as a tool to access the basic concepts and skills relating to the subject matter.

Based on the assumption that the target language is best developed through the academic content, CLIL co-exists alongside

content-based instruction (CBI). This may lead to some confusion as to what these two terms specifically refer to. For some scholars such as Lara Garridio (n.d.), CLIL is an umbrella term that includes CBI; as a consequence, the two notions may be interchangeably referred to. However, for other scholars including Fernandez (2009), despite the overlapping characteristics, such as content-driven, contextualized learning, discourse construction content, and being task-oriented, the two approaches differ in a number of aspects, such as the foci of the approaches. For instance, Lasagabaster (2008) has pointed out that, compared with CBI, CLIL is distinctive in the way that the approach emphasizes both language and content. This corresponds with the explanation of Wolff (2010) that the goal of CLIL is to improve the learners' foreign language as well as content competence. That is what makes CLIL differ from CBI – its focus on content with language skills incidentally acquired in the process of learning. Apart from the focus of the two approaches, Coyle, Hood, and Marsh (2010: 6) have posited that the second factor that makes CLIL different from CBI is the integration of the four main dimensions, namely, content, cognition, communication, and culture in teaching and learning practice. Thus, it may be concluded that although CLIL and CBI share several characteristics, CLIL places emphasis on both content and language, and it integrates the four blocks of learning (content, communication, cognition, and culture), while CBI draws on the basis that content is the main focus of the learning process during which language is acquired by chance, and cognition and culture may not be the highlight of the approach.

With regard to the components of CLIL, of the main factors that makes the approach distinctive from CBI, there are two main perspectives that are widely accepted: 1) that portrayed through the Internet site called The CLIL Compendium (2001), and 2) that of Coyle, Hood, and Marsh (2010). As for the former, the website The CLIL Compendium states the five main components of CLIL as being as follows: a) culture – building intercultural knowledge and understanding, b) environment – preparing for internationalization,

c) language – developing the target language competence, d) content – promoting studying content via various views, and e) learning – promoting learning strategies. As for the latter perspective, as suggested by Coyle, Hood, and Marsh, the four major components of CLIL comprise: a) content – the subject matter or curricular subjects taught in the target language, b) communication – the foreign language which learners learn as the target language, c) cognition – cognitive or thinking skills which drive the instructional process, and d) culture – understanding learners' own culture as well as other cultures (sometimes viewed as Community or Citizenship (Bently, 2010)). According to Coyle, Hood, and Marsh (2010), the four building blocks are interrelated and should be considered holistically, as illustrated in Figure 1 below.

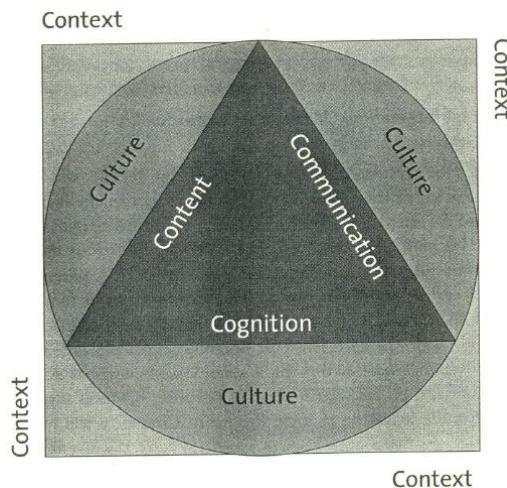


Figure 1: The 4Cs of CLIL (Coyle, Hood, and Marsh, 2010)

It can be seen that the two perspectives are quite similar in that they focus on content, language, and culture as the three main components of the approach. Nonetheless, The CLIL Compendium emphasizes environment (preparing for internationalization, especially EU integration) and learning (promoting learning strategies through different forms of classroom practice) as the other two major components, while

Coyle, Hood, and Marsh highlight cognition (promoting cognitive or thinking skills that drive the learning process) as the other main component.

In brief, CLIL is an educational approach that has as its basis the subject matter playing a vital role in learning the target language. Nevertheless, apart from content and language, CLIL encompasses other main components such as culture, environment, learning strategies, and cognition. This makes CLIL distinctive from other educational approaches, particularly CBI.

### ***Implementation of CLIL in higher education***

As relates to the aforementioned four major components of CLIL, several scholars have elaborated on the benefits of CLIL in terms of language, content, cognition, and culture (Clegg, 2006; Darn, 2006; and European Commission, 2012). Such benefits have resulted in CLIL implementations in various contexts, including in higher education.

In terms of foreign language learning, CLIL has proven to be successful at the university level for both receptive and productive language skills (Dalton-Puffer, 2007). As for writing, the positive effects of CLIL in higher education can be seen as illustrated in several studies. Suwannoppharat (2014), for example, incorporated the principles of the CLIL approach into the course to enhance cultural awareness and English communication ability. According to the findings from the formative assessment processes, 24 Thai undergraduate students in the Chinese International Program had a higher degree of improvement in their individual writing tasks after learning from the feedback for the group work writing tasks as well as the discussion with their classmates and the instructor. Similarly, in another research carried out by Tai (2015), the analysis of 57 written assignments indicated that the 19 Japanese undergraduate students in an elective CLIL course concerning intercultural communication developed their writing skill in terms of both accuracy and fluency throughout the semester.

As concerns the content and culture aspects, it is worth noting that although the effectiveness of CLIL on the content and culture outcomes has been mentioned by several scholars, existing research findings on its effectiveness are fairly rare. In spite of this, the success of CLIL in terms of content and culture has been reported in some studies. As for the content aspect, Chostelidou and Grivab (2014) explored the effects of the CLIL accountancy program in the Greek context in terms of development in content knowledge as well as reading skill. It was found that the CLIL group (N=139) significantly outperformed the non-CLIL group (N=131) in both the subject-specific content and reading skill. Besides, in terms of the culture aspect, Suwannoppharat (2014) found that 24 Thai undergraduate students in the Chinese International Program achieved a higher degree of cultural awareness and English communication ability after the CLIL implementation in the course.

As can be seen in the studies previously mentioned, CLIL is beneficial in higher education in terms of writing development, as well as content and culture aspects. Apart from this, the benefits of the CLIL approach can be traced from the positive opinions of the university students participating in the CLIL course as shown in many research studies. For instance, in the Polish context, Papaja (2012) has reported on the positive attitude of the 108 CLIL students from the Department of Psychology of the University of Silesia, Poland, toward their CLIL classrooms. That is, the findings illustrate the students' satisfaction from learning both the English language and the subject matter through CLIL. Likewise, another research study conducted by Soulioti (2014) found a positive attitude toward CLIL implementation of 65 undergraduate students in the Speech and Language Therapy Department of Epirus Institute of Technology in Greece. That is to say, the findings showed that students strongly felt that CLIL helped foster their progress in both language learning and content knowledge. Besides, in the CLIL accountancy program at university level in Greece the CLIL group expressed a higher positive attitude toward

the course than their peers in the non-CLIL group (Chostelidoua and Grivab, 2014).

To summarize, the literature review on the implementation of CLIL in higher education has portrayed positive results of the CLIL approach in writing progress, as well as in the content and culture outcomes. Hence, to help prove the effectiveness of CLIL in higher education in the Thai context, the present study aims at investigating the extent to which a CLIL (Content and Language Integrated Learning) course at university level in Thailand improves undergraduate Agricultural students' writing ability, agricultural content, and cultural knowledge.

## **Methodology**

### ***Study design***

The present study was a quasi-experimental research with a one-group pre-test post-test design.

### ***Participants***

The participant sample comprised an intact group of 27 second-year, third-year, and fourth-year students majoring in Agricultural Technology at King Mongkut's Institute of Technology Ladkrabang (KMITL), a public university in Bangkok. Their ages ranged from 18 to 21 years, and there were both males and females. Their native language was Thai. The level of their English language proficiency was either pre-intermediate or intermediate. These students had already taken two required courses called Foundation English 1 and 2, and were currently taking the English for Academic Purposes course to prepare for academic success in their subsequent courses, as well as in their prospective work.

### ***Instrumentation***

The instruments used in the present study can be divided into the research instrument and the data collection instruments.

The research instrument refers to the CLIL course designed by the researchers. It consisted of six units, each of which focused on one sub-topic of agricultural content. The class met once a week, and each unit lasted two sessions (three hours per session). Thus, each unit took six hours, and there were altogether 36 hours in the course. The CLIL course contents were based on the CLIL 4Cs Framework suggested by Coyle, Hood, and Marsh (2010) and the framework of conceptualizing content for syllabus design as proposed by Graves (2000: 27-31, 42-52). Hence, the contents of the course were conceptualized on 1) agricultural content, 2) English language skills, particularly on writing skills, 3) thinking skills, and 4) cultural knowledge in agricultural contexts. That is to say, in each unit, both the sub-topic of agricultural contents and cultural knowledge related to that particular sub-topic of agricultural content were delivered to the students, and English language skills, particularly writing skills, as well as thinking skills, were simultaneously promoted. The six sub-topics of the agricultural contents were 'environmental factors that affect plant growth,' 'irrigation methods,' 'site selection for poultry farms,' 'poultry housing,' 'marketing setting: e-marketing,' and 'the marketing mix,' and the six topic areas of cultural knowledge were 'water management in Northeast Thailand,' 'irrigation in Thailand and Malaysia,' 'good agricultural practices for the location and layout of chicken breeder farms: Thailand,' 'poultry housing in Thailand,' 'the state of e-commerce within the ASEAN region,' and 'the marketing mix: Thai rice exports.' In terms of the development of writing skills, the two text types were the cause and effect text type and the process text type. The course contents in terms of the agricultural content and the cultural knowledge, as well as the writing text types under focus, were selected based on a needs analysis conducted earlier with five groups of stakeholders: Agricultural Technology students, ESP teachers, content teachers, employees in agribusiness, and employers in agribusiness.

Regarding instructional activities and materials, various classroom activities such as group and pair work, as well as

various materials including PowerPoint slides and video clips, were incorporated into the course. Finally, the process writing approach which encompassed the steps of outlining, writing, and editing was employed to teach writing.

In this study, the instruments used to collect data comprised the English writing test, the agricultural content test, the cultural knowledge test, and the students' attitude toward the CLIL course interview protocol used to obtain the students' attitude toward the CLIL course. The instruments were developed by the researcher based on an extensive review of literature and related research, and they were examined by a panel of experts in English language instruction, English language assessment and evaluation, and agriculture, to ensure their content validity and language appropriateness before they were administered to the study subjects. The writing test consisted of the two writing tasks: a cause and effect paragraph ("Effects of low temperature on mango trees") and a process paragraph ("How to prevent chicken diseases"). The agricultural content test measured the students' content knowledge related to the six major sub-topics of agricultural content previously mentioned, and the cultural knowledge test assessed the students' cultural knowledge in six sub-topic areas of culture related to the agricultural content also previously discussed. The other data collection instrument was the students' attitude toward the CLIL course interview protocol which was also designed by the researchers. This semi-structured interview protocol was composed of five open-ended items and was validated by a panel of experts in English language instruction and English language assessment and evaluation before it was used in the main study.

### ***Data collection and data analysis***

The English writing test, the agricultural content test, and the cultural knowledge test were administered as the pre-tests before implementation of the CLIL course and as post-tests after implementation. The students' attitudes toward the CLIL course interview protocol were followed with ten students voluntarily

sharing their opinions toward the CLIL course after implementation had ended. Descriptive statistics of frequency, percentage, mean, and standard deviation as well as inferential statistics of the dependent sampled t-test were used to analyze the data obtained from the English writing test, the agricultural content test, and the cultural knowledge test. Content analysis was also employed to analyze qualitative data obtained from the in-depth interviews.

### **Findings and Discussion of Findings**

#### ***The extent to which the CLIL course improves the English writing ability of undergraduate students***

According to the study findings, the students' post-test mean score for the cause and effect writing in Task 1 ( $X = 52.740$ ) was higher than the pre-test mean score ( $X = 35.130$ ) with statistical significance ( $t(26) = 9.337$ ,  $p < 0.01$ ). Also, their post-test mean score for the process writing in Task 2 ( $X = 54.870$ ) was higher than the pre-test mean score ( $X = 21.963$ ) with statistical significance ( $t(26) = 8.623$ ,  $p < 0.01$ ). Therefore, it could be said that the CLIL course seemed to be able to increase students' English writing ability, as shown in Tables 1 and 2 below.

**Table 1: Pre- and Post-test of English Writing Ability (Task 1)**

	<b>Mean (n = 27)</b>	<b>SD</b>	<b>Mean Differences</b>	<b>t</b>	<b>df</b>	<b>Sig (2-tailed)</b>
Pre-test	35.130	4.6773	17.574	9.337	26	.001**
Post-test	52.704	9.9472				

**\*\* $p < 0.01$**

**Table 2: Pre- and Post-test Results of English Writing Ability (Task 2)**

	<b>Mean</b> (n = 27)	<b>SD</b>	<b>Mean</b> <i>Differences</i>	<b>t</b>	<b>df</b>	<b>Sig</b> (2-tailed)
Pre- test	21.963	16.5424	17.574	8.623	26	.001**
Post- test	54.870	10.0524				

\*\**p* < 0.01

Moreover, it was found that following the implementation of the CLIL course, the students were able to write paragraphs with better organization, more thorough and detailed content, more effective word choices, and more grammatically correct sentence structures, with fewer errors in terms of spelling, punctuation, capitalization, and paragraphing. Such findings yield further support for the effectiveness of CLIC courses in improving students' English writing ability, as can be seen in Tables 3 and 4.

**Table 3: Descriptive Statistics of the Students' Scores in Content, Organization, Vocabulary, Language Use, and Mechanics of Writing of the Pre-Test**

#### **Pre-test**

<b>Writing Criteria</b>	<b>Range</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b> (n = 27)	<b>SD</b>
Content	18	0	18	9.37	6.270
Organization	12	0	12	5.11	3.512
Vocabulary	9	0	9	5.00	3.328
Language use	11	0	11	4.00	3.076
Mechanics of writing	2	0	2	1.41	0.931

**Table 4: Descriptive Statistics of the Students' Scores in Content, Organization, Vocabulary, Language Use, and Mechanics of Writing of the Post-Test**

**Post-test**

Writing Criteria	Range	Minimum	Maximum	Mean (n = 27)	SD
Content	2	13	15	13.07	0.385
Organization	9	8	17	11.70	2.509
Vocabulary	1	7	8	7.07	0.267
Language use	13	7	20	12.15	4.521
Mechanics of writing	1	3	4	3.33	0.480

The students' statistically significant improvement in their English writing ability could be seen as an indicator of the effectiveness of the implementation of the CLIL course. This may have been because one of the main foci of this educational approach is 'the target language' (Coyle, Hood, and Marsh, 2010; Bently, 2010; Dalton-Puffer (2007). This corresponds with what several scholars have previously claimed, that CLIL could help students improve their writing skills (Dalton-Puffer, 2007). For example, according to the findings by Suwannoppharat (2014), CLIL implementation at a university setting in Thailand was successful in developing students' foreign language competence in terms of writing. That is to say, 24 Thai undergraduate students in the Chinese International Program made greater progress in their individual writing tasks after learning from the feedback for the group work writing tasks as well as discussion with their classmates and the instructor as shown in the formative assessment processes. Likewise, Tai (2015) has also reported on the effectiveness of CLIL in an elective CLIL course concerning intercultural communication. That is, the 19 Japanese undergraduate students in the course improved their writing skills in terms of both accuracy and fluency throughout the semester.

***The extent to which the CLIL course improves the agricultural content of undergraduate students***

After the implementation of the 12-week CLIL course, the students' post-test score for agricultural content test was 9.85, which was statistically significantly higher than their pre-test score of 5.59 ( $t (26) = 7.064$ ,  $p < 0.05$ ), as shown in Table 5. Such a finding could be regarded as evidence of the effectiveness of the CLIC course in increasing students' content knowledge, which is one of the main foci of this educational approach (Coyle, Hood, and Marsh, 2010; Bently, 2010; Dalton-Puffer, 2007). Such a finding is in line with research carried out by Chostelidou and Grivab (2014) at the university level in the Greek setting. Those findings revealed the positive effects of a CLIL accountancy program in terms of content knowledge as well as reading skills. That is, the CLIL group significantly outperformed the non-CLIL group for both the subject-specific content and reading skill as evident from the data obtained from a pre-and post- CLIL test.

**Table 5: Pre- and Post-test Results of the Agricultural Content Test**

	<b>Mean (n = 27)</b>	<b>SD</b>	<b>Mean Differences</b>	<b>t</b>	<b>df</b>	<b>Sig (2-tailed)</b>
Pre-test	5.59	1.845	4.259	7.064	26	.000**
Post-test	9.85	2.088				

\*\* $p < 0.01$

***The extent to which the CLIL course improves the cultural knowledge of undergraduate students***

As shown in Table 6 below, the students' post-test mean score for the cultural knowledge test of 6.74 was statistically significantly higher than their pre-test mean score of 5.74 ( $t(26) = 2.306$ ,  $p < 0.05$ ) after attending the 12-week CLIL course. This finding helps shed light on the effectiveness of CLIL implementations in terms of students' acquisition of 'culture',

understanding their own culture as well as others' cultures, another major component of the CLIL approach highlighted by Coyle, Hood, and Marsh (2010). Such a finding yields support for the beliefs of a number of CLIL advocates. For example, Sudhoff (2010) mentioned that the nature of the CLIL course/program, which uses the target language as a tool to gain content knowledge, allows students to form connections with the real world, which contributes to the construction of their cultural identity. Similarly, Pokrívčáková, Menzlová, and Farkašová (2010) have mentioned that, in addition to target language competence, CLIL provides a great opportunity to develop students' cultural awareness, knowledge, and competence. The finding of the present study, in terms of cultural knowledge, also corresponds with the research finding reported by Suwannoppharat (2014). That is, 24 Thai undergraduate students in a Chinese International Program had a higher degree of cultural awareness following implementation of the CLIL course to enhance cultural awareness and English communication ability.

**Table 6: Pre- and Post-test Results of Cultural Knowledge Test**

	<b>Mean (n = 27)</b>	<b>SD</b>	<b>Mean Differences</b>	<b>t</b>	<b>df</b>	<b>Sig (2-tailed)</b>
Pre-test	5.74	1.992	1.000	2.306	26	.029**
Post-test	6.74	1.973				

\*\**p* < 0.05

### ***Students' attitudes toward the CLIL course***

In this study, ten student volunteers were recruited for an interview to explore their attitudes toward the implementation of the CLIL course by giving their opinions to the following questions:

- 1) Do you think the course contents can improve your ability to work in agribusiness?

2) Do you think the teaching methods and activities of the CLIL course can improve your writing ability?

3) Do you think the teaching methods and activities of the CLIL course can promote the learning of agricultural content and cultural knowledge?

4) Do you think the instructional materials of each unit in general can promote the practice of writing?

5) Do you think the instructional materials of each unit in general can promote the learning of the agricultural content and cultural knowledge?

Question 1: Do you think the course contents can improve your ability to work in agribusiness?

As for the benefits of the course contents, the students claimed that the CLIL course contents helped them improve their English language ability which was deemed vital for their career in the agribusiness, as evident in the following excerpt:

*I think the course contents help me develop my English reading and writing skills, which are very important for my future career. After I learned through the course, I found that I spend less time on comprehending a reading text, and I can produce a piece of writing on the paragraph level.*

Furthermore, it was found that all of the ten students agreed that the course contents improved their ability to work in the agribusiness in terms of their agricultural content, technical terms in the field of agriculture, and cultural knowledge, as reflected in the following sentiment:

*The contents of this course can help me gain more agricultural content and cultural knowledge, which are quite important for employees in agribusiness in the era of the ASEAN Community.*

Question 2: Do you think the teaching methods and activities of the CLIL course can improve your writing ability?

In terms of writing, the students claimed the way the language use was embedded in the writing sessions of the course provided them with the chance to learn the grammatical aspects needed for writing each text type. Apart from that, the students agreed that the process-based writing approach applied in this course could make them clearly see and understand the steps of writing. That is, the writing procedure which includes outlining, writing, and editing, could make them eventually write a piece of writing:

*In this course, I learned about the writing procedure. As far as I'm concerned, these steps, especially outlining and making drafts, made me know how to write, and this helped improve my writing skills.*

However, one of the students claimed that doing the peer reviews with the same peers might not be able to yield sufficient constructive new feedback, so she suggested the teacher assign each student to work with new peers for each writing session:

*I think it would be better to work with new peers every time that we're supposed to form a peer review group. This is because it might allow us to get new useful comments on our writing assignments.*

Question 3: Do you think the teaching methods and activities of the CLIL course can promote the learning of agricultural content and cultural knowledge?

When it came to learning agricultural content and cultural knowledge, the students agreed that the teaching methods and activities of the CLIL course could promote such learning:

*Instructional activities, particularly games, made the lesson fun, so the class was not boring.*

Nevertheless, one of the students complained that games were not sufficiently used in the course; consequently, she required more games to be incorporated into each lesson in order to help capture the students' attention and create an atmosphere that contributes to learning:

*I want more games to be used in each lesson. This could make me more focused on the contents and help set up a positive learning atmosphere.*

Question 4: Do you think the instructional materials of each unit in general can promote the practice of writing?

As for practicing writing, the students agreed that the instructional materials of each unit in general could promote such practice. They claimed that the instructional worksheets were precise, the video clips were interesting, and the PowerPoint slides were effective. To be specific, the slides could capture students' attention and were clear:

*Generally, the instructional materials of each unit helped me practice my writing. I really liked the slides that provided feedback on writing assignments. With such slides, I could learn to improve how to write by learning from my friends' mistakes as well as from my own mistakes.*

Question 5: Do you think the instructional materials of each unit in general can promote the learning of agricultural content and cultural knowledge?

In terms of learning agricultural content and cultural knowledge, the students confirmed that the instructional materials of each unit in general could promote such learning. That is, the instructional materials of each unit were applied appropriately, more or less:

*The use of the instructional materials of each unit in general was suitable. It was neither too much nor too little, so the students were not spoon-fed, and this led to the understanding of the agricultural content and the culture part.*

As indicated from above, positive attitudes of the students toward the course were evident. That is, the students believed that the CLIL practice made them progress in their writing as well as in their agricultural content and cultural knowledge by means of various teaching methods and activities and of precise and interesting instructional materials.

Such students' positive responses toward the CLIL course were in line with those documented in related previous studies. For example, Papaja (2012) found that CLIL implementation in the Polish context resulted in positive attitudes among 108 CLIL students from the Department of Psychology of the University of Silesia toward their CLIL classrooms. To be specific, the finding reflects students' satisfaction from learning the English language as well as the subject matter through CLIL. Similarly, in the Greek setting, Soulioti (2014) reported on the positive attitude toward CLIL implementation among 65 undergraduate students in the Speech and Language Therapy Department of Epirus Institute of Technology. As revealed in the finding, the students strongly felt that CLIL helped promote their development in both language learning and content knowledge. Furthermore, Chostelidou and Grivab (2014) indicated that the CLIL group under the CLIL accountancy program at university level in Greece had higher positive attitudes toward the course than their peers in the non-CLIL group.

### **Implications of the Findings**

According to the findings of the research study, the following pedagogical implications can be proposed.

First, as can be seen from the findings of the study, the CLIL approach was beneficial for the students' development in

English language abilities, agricultural content, and cultural knowledge. As a result, CLIL should be implemented/applied in a language course/curriculum, particularly an ESP course/curriculum. That is to say, administrators and stakeholders should promote developing a course/curriculum that helps improve language learners' English language abilities together with content in their major field of study and cultural knowledge.

In so doing, a needs analysis whose significance is well-established in the field of ESP should be conducted (Alejo and Piquer, 2010; Ruiz-Garrido and Fortanet-Gómez, 2015) so that the implementation on the basis of the CLIL theoretical framework (the4cs framework) can suit the needs of a particular group of CLIL learners. A needs analysis should be applied with all stakeholders in order to ascertain the needs for language abilities (communication), thinking abilities (cognition), agricultural content (content), and cultural knowledge (culture).

Second, since the students tended to express positive attitudes toward the course due to the various teaching methods and activities employed (e.g., the process-based writing approach which was applied in teaching the practice of writing), a wide range of teaching methodologies can be integrated into CLIL. This concurs with Coyle, Hood, and Marsh (2010; 3), who pointed out that "CLIL is an educational approach in which various language-supportive methodologies are used." In fact, several scholars have suggested CLIL implementations with other educational approaches, such as CLIL plus the task-based approach (Tardieu, 2012) in the setting of France, and CLIL plus the project-based approach in the setting of Portugal (Simões, A. R., et al., 2013).

Third, as the students showed satisfaction with the course due to the precise and interesting instructional materials, appropriate materials for specific contexts are needed. This can be seen as a challenge for language teachers who need to develop materials suitable in terms of both the language aspect and the content aspect. That is, on the one hand, subject teachers have to study more about the language which is important for the subject matters. On the other hand, language teachers have to study more

about content (Wolff, 2010). To solve the problem and to be able to produce such well-designed materials, collaboration between subject teachers and language teachers is vital.

### **Limitations of the Study**

This study aimed to investigate the extent to which a CLIL course at university level in Thailand improves English writing ability, agricultural content, and cultural knowledge of undergraduate students. As a consequence, other English language skills, such as speaking and listening were not the foci of the study. Also, due to the fact that the study employed a one-group pre-test post-test design, and the study sample was an intact group of the students majoring in Agriculture, generalization of the findings should be made with caution.

### **Recommendations for Further Research**

Since the present research study was subject to several limitations, the following recommendations, with respect to such aforementioned implications, are proposed as follows:

First, this research study employed a one-group pretest-posttest design which measured the participants' English language abilities, agricultural content, and cultural knowledge, before and after learning through the treatment (the CLIL course). Consequently, to obtain more empirical research findings, further research studies may employ a true experimental design, with an experimental group and control group to better measure the effects of CLIL on students' English language abilities, agricultural content, and cultural knowledge.

Second, this research study investigated the extent to which the CLIL approach improves Agricultural technology students' English language abilities, agricultural content, and cultural knowledge related to agricultural content. Hence, further research studies may be conducted with students in other fields of study, such as Science or Information Technology, to explore the extent to which a CLIL course implemented in tertiary education

improves English writing ability, agricultural content, and cultural knowledge of students with different majors.

Third, this research study focused on the extent to which a CLIL course improves the students' writing ability. Further research may be carried out to explore the extent to which a CLIL course improves the students' listening and speaking abilities, or on grammatical competence.

### **Acknowledgements**

We would like to express our deepest gratitude to the Higher Education Research Promotion (HERP), under the Office of the Higher Education Commission (OHEC), for their support on the grant offered. We greatly appreciate it.

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